10-29-1960

Test 776: International TD 340 (Diesel)

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 776 - INTERNATIONAL TD 340 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean and Acting Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cooling med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
39.80	2000	3.038	0.542	13.10	214	57	75	28.890
Standard Power Take-off Speed (540 rpm)—One Hour								
36.15	1775	2.745	0.539	13.17	212	57	75	28.895
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
35.24	2082	2.446	0.493	14.41	197	58	76	.....
0.00	2202	0.866	....	....	165	56	74	.....
18.18	2150	1.563	0.611	11.63	176	57	74	.....
39.56	1999	3.038	0.545	13.02	211	58	76	.....
9.20	2178	1.179	0.910	7.80	170	55	72	.....
26.90	2120	1.973	0.521	13.63	182	56	73	.....
Av **21.51**	**2122**	**1.844**	**0.609**	**11.66**	**183**	**57**	**74**	**28.908**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—2nd Gear											
31.64	5592	2.12	1998	4.97	2.862	0.642	11.06	190	44	50	28.580
75% of Pull at Maximum Power—Ten Hours—2nd Gear											
25.60	4260	2.25	2088	3.56	2.281	0.633	11.22	179	46	54	28.498
50% of Pull at Maximum Power—Two Hours—2nd Gear											
18.08	2894	2.34	2137	1.84	1.828	0.718	9.89	168	31	32	28.520
MAXIMUM POWER WITH BALLAST											
25.93	6801	1.43	2096	6.71	1st Gear.....			175	43	49	28.560
32.72	5735	2.14	1999	4.29	2nd Gear.....			177	42	47	28.580
32.27	4116	2.94	2004	2.71	3rd Gear.....			179	43	49	28.550
32.19	2859	4.22	2002	1.34	4th Gear.....			178	43	49	28.550
28.14	1811	5.83	2005	0.77	5th Gear.....			180	38	42	28.610

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—2nd Gear						
Pounds pull	5750	5900	6000	5950	5850	5450
Horsepower	32.7	29.9	27.2	23.8	20.3	16.0
Miles per hour	2.1	1.9	1.7	1.5	1.3	1.1

Department of Agricultural Engineering
Dates of Test: October 29 to November 2, 1960
Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS
Manufacturer's Power Rating: 39 PTO Horsepower and 33 Drawbar Horsepower (corrected to standard conditions)

FUEL, OIL and TIME Fuel No 2 Diesel **Cetane No** 47 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8528 **Weight per gallon** 7.101 lb **Oil** SAE 10W **API service classification** DS **To motor** 1.753 gal **Drained from motor** 1.133 gal **Transmission and final-drive lubricant** IH Hy Tran fluid **Total time engine was operated** 41 hours.

ENGINE Make International Diesel **Type** 4 cylinder vertical **Serial No** D166 911 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** $3^{11}/_{16}$" x 3⅞" **Compression ratio** 19.7 to 1 **Displacement** 166 cu in **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** dry type with replaceable element **Oil filter** replaceable treated paper element **Fuel filter** one replaceable radial fin treated paper element **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type tracklayer **Serial No** TD-340-4328 **Tread width** 48" **Wheel base** 66" **Drawbar height** 11" **Measured length of track** 17.5 ft **Cleats** integral with shoes **Cleats per track** 35 **Size of cleats** 14" x 1⅞" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.5" Vertical distance above roadway 20.5" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** first 1.46 second 2.23 third 3.0 fourth 4.26 fifth 5.83 reverse 1.82 **Clutch** single plate dry disc operated by foot pedal **Brakes** double disc operated by steering levers or one foot pedal for both brakes **Steering** hand levers controlling brakes and single disc planetary steering **Turning space diameter** (with brake applied) right 161" left 161" **Belt pulley** 1064 rpm at 2000 engine rpm diam 11" face 7½" **Belt speed** 3064 fpm **Power take-off** 608 rpm at 2000 engine rpm.

TOTAL WEIGHT with operator 7135 lbs including front bumper 405 lbs, crankcase guards 37 lbs, front transmission guard 36 lbs, independent power take-off 130 lbs. swinging drawbar 68 lbs, track roller shields 130 lbs, 12 gallon hydraulic pump with dual control valves 82 lbs.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 776.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ the 85% torque; maximum power; ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

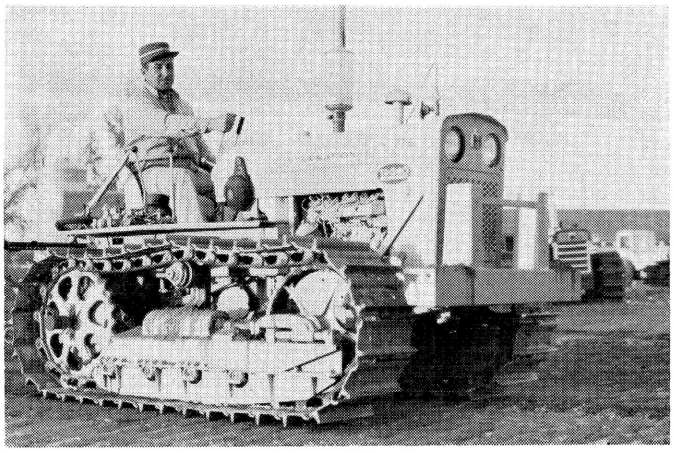
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions; (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**



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